

WHAT IS CLAIMED IS:

1. A display device comprising:  
a display;  
5 a display controller;  
a first means for dividing one frame period into a plurality of subframe periods and setting one of lighting and non-lighting to each of the plurality of subframe periods, and for expressing n-bits gradation (n is a natural number of two or more) in accordance with a total lighting time during the one frame period; and  
10 a second means not for dividing one frame period into a plurality of subframe periods, for setting one of lighting and non-lighting to the one frame period, for expressing 1-bit gradation in accordance with a total lighting time during the one frame period, and for operating the display with a lower clock frequency and a lower driving voltage than the first means,  
15 wherein the first and second means are controlled by the display controller.

2. A display device comprising:  
a display;  
a display controller;  
20 a first means for dividing one frame period into a plurality of subframe periods and setting one of lighting and non-lighting to each of the plurality of subframe periods, and for expressing n-bits gradation (n is a natural number of two or more) in accordance with a total lighting time during the one frame period; and  
a second means not for dividing one frame period into a plurality of subframe  
25 periods, for setting one of lighting and non-lighting to the one frame period, for expressing 1-bit gradation in accordance with a total lighting time during the one frame period, and having a longer frame period as compared to the one frame period for expressing n-bits gradation and operating the display with a lower clock frequency and a lower driving voltage than the first means,  
30 wherein the first and second means are controlled by the display controller.

3. A display device according to claim 1,  
wherein the display device further comprises a frame memory;  
n-bits data (n is a natural number of two or more) is written and read out to  
35 perform a display operation in the first means; and  
1-bit data is written and read out to perform a display operation in the second



means.

4. A display device according to claim 2,  
wherein the display device further comprises a frame memory;  
5 n-bits data (n is a natural number of two or more) is written and read out to  
perform a display operation in the first means; and  
1-bit data is written and read out to perform a display operation in the second  
means.

10 5. A display device according to claim 1,  
wherein the display device further comprises a light emitting element for each  
pixel;  
a specific voltage is applied to the light emitting element; and  
a voltage applied to the light emitting element in the first means is higher than a  
15 voltage applied to the light emitting element in the second means.

6. A display device according to claim 2,  
wherein the display device further comprises a light emitting element for each  
pixel;  
20 a specific voltage is applied to the light emitting element; and  
a voltage applied to the light emitting element in the first means is higher than a  
voltage applied to the light emitting element in the second means.

7. A display device according to claim 1,  
25 wherein the display device further comprises a light emitting element for each  
pixel;  
a specific current is supplied to the light emitting element; and  
a current supplied to the light emitting element in the first means is larger than a  
current supplied to the light emitting element in the second means.

30 8. A display device according to claim 2,  
wherein the display device further comprises a light emitting element for each  
pixel;  
a specific current is supplied to the light emitting element; and  
35 a current supplied to the light emitting element in the first means is larger than a  
current supplied to the light emitting element in the second means.



9. A display device according to claim 1,  
wherein the one frame period of the first means is composed of three periods of a  
write-in period, a display period, and an erasing period.

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10. A display device according to claim 2,  
wherein the one frame period of the first means is composed of three periods of a  
write-in period, a display period, and an erasing period.

10 11. A display device according to claim 1,  
wherein the display controller operates at a lower voltage in the second means as  
compared to in the first means.

12. A display device according to claim 2,  
15 wherein the display controller operates at a lower voltage in the second means as  
compared to in the first means.

13. A display device comprising:  
a display;  
20 a display controller;  
a first means for dividing one frame period into a plurality of subframe periods and  
setting one of lighting and non-lighting to each of the plurality of subframe periods, and  
for expressing n-bits gradation (n is a natural number of two or more) in accordance  
with a total lighting time during the one frame period; and  
25 a second means for dividing one frame period into a plurality of subframe periods  
and setting one of lighting and non-lighting to each of the plurality of subframe periods,  
for expressing m-bits gradation (m is a natural number less than n) in accordance with a  
total lighting time during the one frame period, and for operating the display at a lower  
clock frequency and a lower driving voltage than the first means,  
30 wherein the first and second means are controlled by the display controller.

14. A display device according to claim 13,  
wherein the display device further comprises a frame memory;  
n-bits data (n is a natural number of two or more) is written and read out to  
35 perform a display operation in the first means; and  
m-bits data (m is a natural number less than n) is written and read out to perform a



display operation in the second means.

15. A display device according to claim 13,  
wherein the display device further comprises a light emitting element for each  
5 pixel;  
a specific voltage is applied to the light emitting element; and  
a voltage applied to the light emitting element in the first means is higher than a  
voltage applied to the light emitting element in the second means.

10 16. A display device according to claim 13,  
wherein the display device further comprises a light emitting element for each  
pixel;  
a specific current is supplied to the light emitting element; and  
a current supplied to the light emitting element in the first means is larger than a  
15 current supplied to the light emitting element in the second means.

17. A display device according to claim 13,  
wherein the one frame period of the first means is composed of three periods of a  
write-in period, a display period, and an erasing period.

20 18. A display device according to claim 13,  
wherein the one frame period of the second means is composed of three periods of  
a write-in period, a display period, and an erasing period.

25 19. A display device according to claim 13,  
wherein the display controller operates at a lower voltage in the second means as  
compared to in the first means.

20. A method of driving a display device having a display and a display controller,  
30 comprising:  
a first display mode for dividing one frame period into a plurality of subframe  
periods and setting one of lighting and non-lighting to each of the plurality of subframe  
periods, and for expressing n-bits gradation (n is a natural number of two or more) in  
accordance with a total lighting time during the one frame period; and  
35 a second display mode not for dividing one frame period into a plurality of  
subframe periods and setting one of lighting and non-lighting to the one frame period,



for expressing 1-bit gradation in accordance with a total lighting time during the one frame period, and for operating the display at a lower clock frequency and a lower driving voltage than the first display mode,

wherein the first and second display modes are controlled by the display controller.

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21. A method of driving a display device having a display and a display controller, comprising:

a first display mode for dividing one frame period into a plurality of subframe periods and setting one of lighting and non-lighting to each of the plurality of subframe periods, and for expressing n-bits gradation (n is a natural number of two or more) in accordance with a total lighting time during the one frame period; and

a second display mode not for dividing one frame period into a plurality of subframe periods, for setting one of lighting and non-lighting to the one frame period, for expressing 1-bit gradation in accordance with a total lighting time during the one frame period, and having a longer frame period than the first display mode and operating the display at a lower clock frequency and a lower driving voltage than the first display mode,

wherein the first and second display modes are controlled by the display controller.

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22. A method of driving a display device according to claim 20,

wherein the display device further comprises a frame memory;

n-bits data (n is a natural number of two or more) is written and read out to perform a display operation in the first display mode; and

1-bit data is written and read out to perform a display operation in the second display mode.

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23. A method of driving a display device according to claim 21,

wherein the display device further comprises a frame memory;

n-bits data (n is a natural number of two or more) is written and read out to perform a display operation in the first display mode; and

1-bit data is written and read out to perform a display operation in the second display mode.

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24. A method of driving a display device according to claim 20,

wherein the display device further comprises a light emitting element for each pixel;

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a specific voltage is applied to the light emitting element; and  
a voltage applied to the light emitting element in the first display mode is higher  
than a voltage applied to the light emitting element in the second display mode.

5        25. A method of driving a display device according to claim 21,  
         wherein the display device further comprises a light emitting element for each  
         pixel;  
         a specific voltage is applied to the light emitting element; and  
         a voltage applied to the light emitting element in the first display mode is higher  
10      than a voltage applied to the light emitting element in the second display mode.

         26. A method of driving a display device according to claim 20,  
         wherein the display device further comprises a light emitting element for each  
         pixel;  
15       a specific current is supplied to the light emitting element; and  
         a current supplied to the light emitting element in the first display mode is larger  
         than a current supplied to the light emitting element in the second display mode.

         27. A method of driving a display device according to claim 21,  
         wherein the display device further comprises a light emitting element for each  
20      pixel;  
         a specific current is supplied to the light emitting element; and  
         a current supplied to the light emitting element in the first display mode is larger  
         than a current supplied to the light emitting element in the second display mode.

25       28. A method of driving a display device according to claim 20,  
         wherein the first display mode is composed of three periods of a write-in period, a  
         display period, and an erasing period.

         29. A method of driving a display device according to claim 21,  
30       wherein the first display mode is composed of three periods of a write-in period, a  
         display period, and an erasing period.

         30. A method of driving a display device according to claim 20,  
         wherein the display controller operates at a lower voltage in the second display  
35      mode as compared to in the first display mode.



31. A method of driving a display device according to claim 21,  
wherein the display controller operates at a lower voltage in the second display mode as compared to in the first display mode.

5        32. A method of driving a display device having a display and a display controller, comprising:

         a first display mode for dividing one frame period into a plurality of subframe periods and setting one of lighting and non-lighting to each of the plurality of subframe periods, and for expressing n-bits gradation (n is a natural number of two or more) in  
10 accordance with a total lighting time during the one frame period; and

         a second display mode for dividing one frame period into a plurality of subframe periods and setting one of lighting and non-lighting to each of the plurality of subframe periods, for expressing m-bits gradation (m is a natural number less than n) in accordance with a total lighting time during the one frame period, and for operating the  
15 display at a lower clock frequency and a lower driving voltage than the first display mode,

         wherein the first and second display modes are controlled by the display controller.

         33. A method of driving a display device according to claim 32,  
20 wherein the display device further comprises a frame memory;  
         n-bits data (n is a natural number of two or more) is written and read out to perform a display operation in the first display mode; and

         1-bit data is written and read out to perform a display operation in the second display mode.

25        34. A method of driving a display device according to claim 32, wherein the display device further comprises a light emitting element for each pixel;

         a specific voltage is applied to the light emitting element; and  
30        a voltage applied to the light emitting element in the first display mode is higher than a voltage applied to the light emitting element in the second display mode.

         35. A method of driving a display device according to claim 32,  
wherein the display device further comprises a light emitting element for each  
35 pixel;

         a specific current is supplied to the light emitting element; and



a current supplied to the light emitting element in the first display mode is larger than a current supplied to the light emitting element in the second display mode.

36. A method of driving a display device according to claim 32,  
5 wherein the first display mode is composed of three periods of a write-in period, a display period, and an erasing period.

37. A method of driving a display device according to claim 32,  
wherein the second display mode is composed of three periods of a write-in period,  
10 a display period, and an erasing period.

38. A method of driving a display device according to claim 32,  
wherein the display controller operates at a lower voltage in the second display  
mode as compared to in the first display mode.

15 39. A display device according to claim 1, wherein the display device is used in an electronic equipment selected from the group consisting of a portable information terminal, a personal computer, an image reproducing device, a television, a head mounted display and a video camera.

20 40. A display device according to claim 2, wherein the display device is used in an electronic equipment selected from the group consisting of a portable information terminal, a personal computer, an image reproducing device, a television, a head mounted display and a video camera.

25 41. A display device according to claim 13, wherein the display device is used in an electronic equipment selected from the group consisting of a portable information terminal, a personal computer, an image reproducing device, a television, a head mounted display and a video camera.

30 42. A method of driving a display device according to claim 20, wherein the display device is used in an electronic equipment selected from the group consisting of a portable information terminal, a personal computer, an image reproducing device, a television, a head mounted display and a video camera.

35 43. A method of driving a display device according to claim 21, wherein the



display device is used in an electronic equipment selected from the group consisting of a portable information terminal, a personal computer, an image reproducing device, a television, a head mounted display and a video camera.

- 5        44. A method of driving a display device according to claim 32, wherein the display device is used in an electronic equipment selected from the group consisting of a portable information terminal, a personal computer, an image reproducing device, a television, a head mounted display and a video camera.